Welcome to the ISIMIP-PROCLIAS cross-sectoral Workshop

16.-19.5.2022

Katja Frieler & Christopher Reyer

ISIMIP Inter-Sectoral Impact Model Intercomparison Project

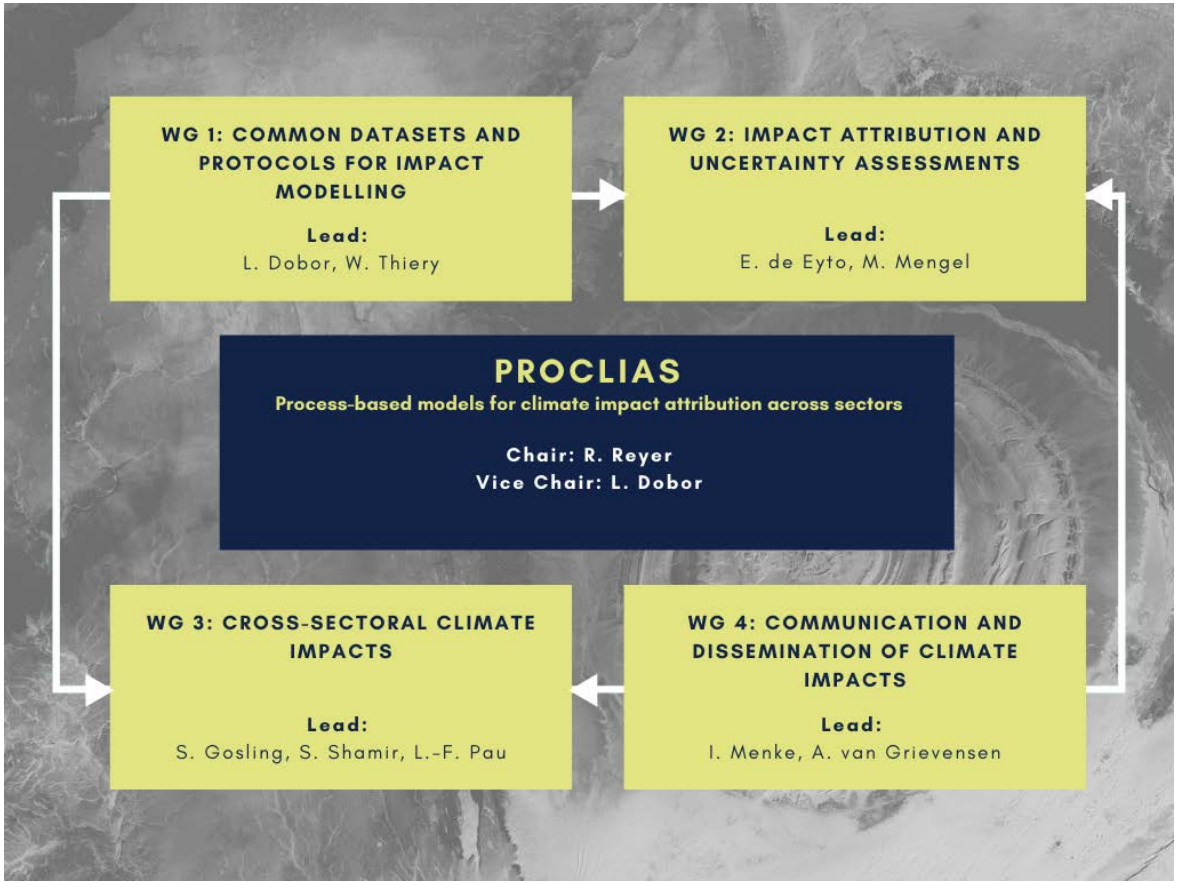
PROCLIAS

cost EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

Celebrating 30 years of integrated climate impact research at the Potsdam Institute.

Leibniz Association

PROCLIAS aims and structure



"*in close cooperation with ISIMIP, PROCLIAS aims to develop common protocols, harmonized datasets and a joint understanding of how to conduct cross-sectoral, multi-model climate impact studies at regional and global scales allowing for attribution of impacts of recent climatic changes and robust projections of future climate impacts.* "

PROCLIAS - Process-based models for climate impact attribution across sectors

- Allow new scientists to join the network and contribute to ISIMIP
- Allow new scientists to learn how to use climate impact models and the data they produce
- Go beyond ISIMIP

Scientific Discussions and Outreach events

Several Scientific Exchange visits and data training (physical and virtual) have been funded

ISIMIP - more than the sum of its pieces

Aggregation of impacts across sectors

- Economic damages: To what degree is climate change increasing poverty undermining the ‘No poverty’ SDG 1?
- Health: To what degree will climate-driven biomes shift affect malaria distribution?
- Water quality: To what degree will climate change amplify water quality degradation along the entire chain from fertilizer input along the rivers to coastal ecosystems?

Uncertainty assessment and model improvement within sectors

- Where does the spread in projected areas burned by wildfires come from?
- Do crop models systematically underestimate the impacts of drought and heatwaves?

ISIMIP - Special Topics

Impact attribution **(tomorrow morning's session)**

- What impacts of climate change on natural and human systems do we already observe?

Integration of mitigation measures and remaining impacts **(next session)**

- What is the combined effect of mitigation measures and remaining climate change on biodiversity?
- Will a renewable energy supply be more sensitive to weather fluctuations than the current one?
- What is the combined effect of mitigation measures and remaining impacts of climate change on global inequality?

ISIMIP and its potential for adaptation planning

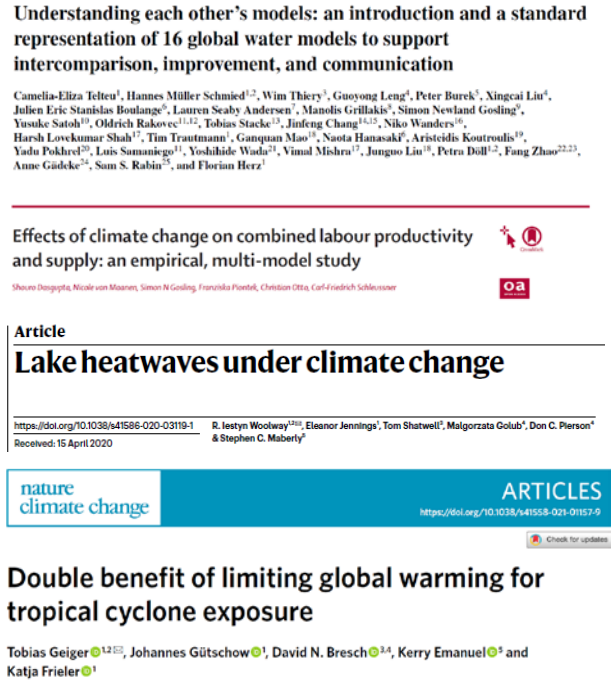
Adaptation is still framed as a predominantly national or local issue…
… and it certainly is a national or local issue. So let's try to provide high resolution regional impacts projections (see next session on high resolution climate forcings)
… but it not only is. It also needs a global perspective as the impacts of climate change will propagate along trade networks, affect global financial markets and require international cooperation to ensure food security or manage shifting species distributions

Cross-Chapter Box INTEREG | Inter-regional Flows of Risks and Responses to Risk

Authors: Birgit Bednar-Friedl (Austria, Chapter 13), Christopher Trisos (South Africa, Chapter 9), Laura Astigarraga (Uruguay, Chapter 12), Magnus Benzie (Sweden/UK), Aditi Mukherji (India, Chapter 4), Maarten Van Aalst (the Netherlands, Chapter 16)

ISIMIP2 very successful and data still being used a lot

- 25 ISIMIP2b papers in 2021 (2x Science, 1x Nature, 1x PNAS, 6x Nat CC/Geosci/Comm)
- Still 4 ISIMIP2a in 2021



Strong representation of ISIMIP in IPCC AR6

Climate change reduces winter overland travel across the Pan-Arctic even under low-end global warming scenarios

Anne Gädeke[1], Moritz Langer[2,3], Julia Boike[2,3], Eleanor J Burke[4], Jinfeng Chang[5,6], Melissa Head[7], Christopher P O Reyer[1], Sibyll Schaphoff[1], Wim Thiery[8,9] and Kirsten Thonicke[1]

⇒cited in Chapter 13 and CCP6.2.4.3

Projecting Exposure to Extreme Climate Impact Events Across Six Event Categories and Three Spatial Scales

Stefan Lange[1], Jan Volkholz[1], Tobias Geiger[1,2], Fang Zhao[3], Iliusi Vega[1], Ted Veldkamp[4,5], Christopher P. O. Reyer[1], Lila Warszawski[1], Veronika Huber[6], Jonas Jägermeyr[1,7,8], Jacob Schewe[1], David N. Bresch[9,10], Matthias Büchner[1], Jinfeng Chang[5,11], Philippe Ciais[11], Marie Dury[12], Kerry Emanuel[13], Christian Folberth[5], Dieter Gerten[1,14], Simon N. Gosling[15], Manolis Grillakis[16], Naota Hanasaki[17], Alexandra-Jane Henrot[12], Thomas Hickler[18,19], Yasushi Honda[20], Akihiko Ito[17], Nikolay Khabarov[5], Aristeidis Koutroulis[21], Wenfeng Liu[11,22], Christoph Müller[1], Kazuya Nishina[17], Sebastian Ostberg[1], Hannes Müller Schmied[18,19], Sonia I. Seneviratne[23], Tobias Stacke[24], Jörg Steinkamp[19,25], Wim Thiery[23,26], Yoshihide Wada[5], Sven Willner[1], Hong Yang[22,27], Minoru Yoshikawa[28], Chao Yue[11,29], and Katja Frieler[1]

⇒cited in Chapter 2 (3x), 4 and 16

Intergenerational inequities in exposure to climate extremes

Young generations are severely threatened by climate change

By Wim Thiery, Stefan Lange, Joeri Rogelj, Carl-Friedrich Schleussner, Lukas Gudmundsson, Sonia I. Seneviratne, Marina Andrijevic, Katja Frieler, Kerry Emanuel, Tobias Geiger, David N. Bresch, Fang Zhao, Sven N. Willner, Matthias Büchner, Jan Volkholz, Nico Bauer, Jinfeng Chang, Philippe Ciais, Marie Dury, Louis François, Manolis Grillakis, Simon N. Gosling, Naota Hanasaki, Thomas Hickler, Veronika Huber, Akihiko Ito, Jonas Jägermeyr, Nikolay Khabarov, Aristeidis Koutroulis, Wenfeng Liu, Wolfgang Lutz, Matthias Mengel, Christoph Müller, Sebastian Ostberg, Christopher P. O. Reyer, Tobias Stacke, Yoshihide Wada

⇒cited in Chapter 7 (2x), 9 (7x) and 13

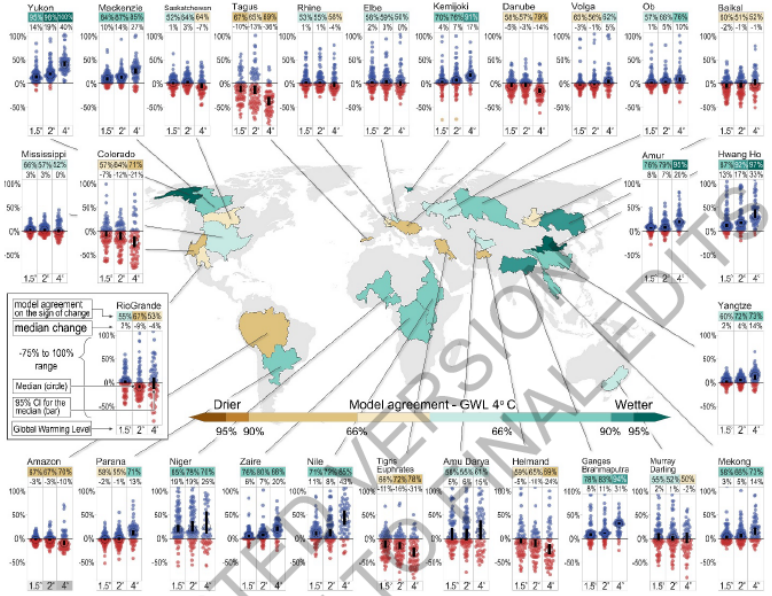


Figure 4.16: Projected changes in the annual mean run-off in selected river basins at Global Warming Levels (GWLs) of 1.5°C, 2°C and 4°C in a combined ensemble. For each named basin, the sinaplot dots show individual model outcomes for percentage increased flows (blue) and decreased flows (red) at each GWL. Black circles show the ensemble median, and black bars show the 95% confidence range in the median. See inset with the Rio Grande sinaplot for additional guidance on interpretation. In the map, the colours in the basins show the percentage model agreement on the sign of the projected change in streamflow at the 4°C GWL. The combined ensemble is comprised of 4 multi-model ensembles: the CMIP5 multi-model ensemble of GCMs driven with RCP8.5; the CMIP6 multi-model ensemble of GCMs driven with SSP5-85; varying combinations of hydrological models with 5 GCMs in the Inter-Sectoral Impacts Model Intercomparison Project (ISIMIP), and; the JULES land ecosystems and hydrology model driven by GCMs from the HELIX study (Betts et al., 2018; Koutroulis et al., 2019). In CMIP5 and CMIP6, the projected run-off changes are directly from the GCM land surface schemes without bias correction. In ISIMIP and HELIX, bias-corrected climate model outputs were used to drive the hydrology models. A comparison of the projected changes at the 4°C GWL for the four individual ensembles is shown in Figure Cross-Chapter Box CLIMATE.1 in Chapter 1.

⇒ISIMIP-related Figures in chap 4 and 5, e.g. 4.16

Strong representation of ISIMIP in IPCC AR6

Understanding the weather signal in national crop-yield variability

Katja Frieler[1], Bernhard Schauberger[1], Almut Arneth[2], Juraj Balkovič[3,4], James Chryssanthacopoulos[5,6], Delphine Deryng[5,7], Joshua Elliott[5,6], Christian Folberth[3], Nikolay Khabarov[3], Christoph Müller[1], Stefan Olin[8], Thomas A. M. Pugh[2,9], Sibyll Schaphoff[1], Jacob Schewe[1], Erwin Schmid[10], Lila Warszawski[1], and Anders Levermann[1,11,12]

⇒ cited in Chapter 4

ARTICLE

https://doi.org/10.1038/s41467-019-08745-6 OPEN

State-of-the-art global models underestimate impacts from climate extremes

Jacob Schewe[1], Simon N. Gosling[2], Christopher Reyer[1], Fang Zhao[3], Philippe Ciais[4], Joshua Elliott[5], Louis Francois[6], Veronika Huber[7], Heike K. Lotze[8], Sonia I. Seneviratne[9], Michelle T.H. van Vliet[10], Robert Vautard[4], Yoshihide Wada[11], Lutz Breuer[12,13], Matthias Büchner[1], David A. Carozza[14,43], Jinfeng Chang[4], Marta Coll[15], Delphine Deryng[16,17], Allard de Wit[18], Tyler D. Eddy[8,19,20], Christian Folberth[11], Katja Frieler[1], Andrew D. Friend[21], Dieter Gerten[1,22], Lukas Gudmundsson[9], Naota Hanasaki[23], Akihiko Ito[23], Nikolay Khabarov[11], Hyungjun Kim[24], Peter Lawrence[25], Catherine Morfopoulos[26], Christoph Müller[1], Hannes Müller Schmied[27,28], René Orth[29,30], Sebastian Ostberg[1], Yadu Pokhrel[31], Thomas A.M. Pugh[32,33], Gen Sakurai[34], Yusuke Satoh[10,23], Erwin Schmid[35], Tobias Stacke[36], Jeroen Steenbeek[37], Jörg Steinkamp[28,44], Qiuhong Tang[38], Hanqin Tian[39], Derek P. Tittensor[8,40], Jan Volkholz[1], Xuhui Wang[4,41,42] & Lila Warszawski[1]

⇒ cited in Chapter 4 (2x) and 5

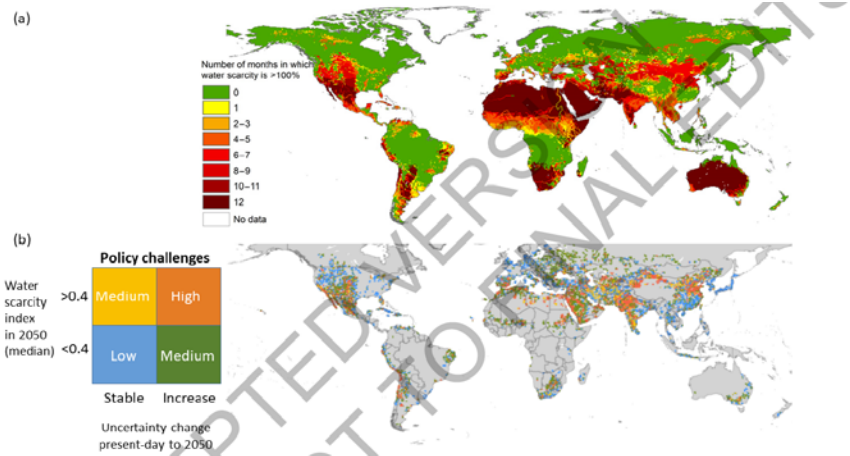
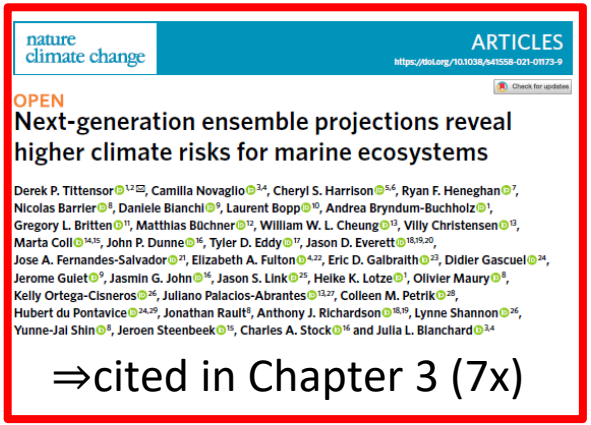


Figure Box 4.1.1: Geographical distributions of current water scarcity and levels of challenge for policies addressing future change. (a) The number of months per year with severe water scarcity (ratio of water demand to availability > 1.0). Reproduced from (Mekonnen and Hoekstra, 2016). (b) Local levels of policy challenges for addressing water scarcity by 2050, considering both the central estimate (median) and the change uncertainty in projections of a Water Scarcity Index (WSI) from the present day to 2050 (Greve et al., 2018). Projections used five CMIP5 climate models, three global hydrological models from ISIMIP, and three Shared Socioeconomic Pathways (SSPs). Levels of policy challenges refer to the scale and nature of policies to address water scarcity and range from monitoring and reviewing risks ('low') through transitional changes in water systems ('medium') to transformational changes ('high'). Low policy challenges arise when the projected water scarcity in 2050 is lower (< 0.4), and the level of uncertainty remains relatively stable in future projections. Medium policy challenge arises when either the central estimate of water scarcity remains low, but uncertainty increases or the uncertainty is stable, but the central estimate of water scarcity for 2050 is higher (>0.4). High policy challenges arise when the central estimate of water scarcity is higher and the uncertainty increases. Grey areas show gridpoints defined as non-water scarce (75th quantile of the WSI < 0.1 at all times) or very low average water demand. Hatched areas show countries with no data for at least one component. Reproduced from (Greve et al., 2018).

ISIMIP3 in full swing

- data from 17 (3a) and 31 (3b) models uploaded
- first papers published
- several Special issues planned (marine fisheries, regional water, impact attribution, ...)
- generation of future Direct Human Forcing (DHF) almost complete



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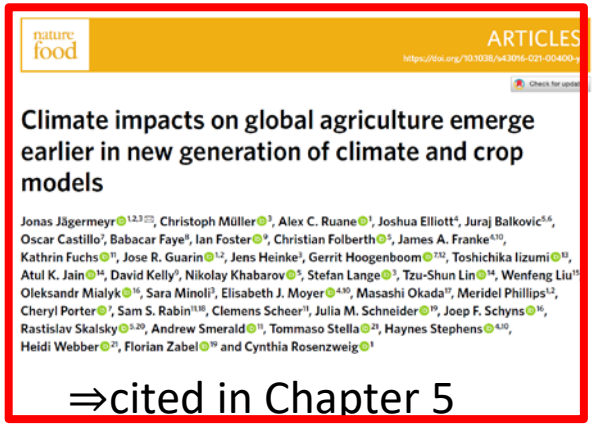


⇒cited in Chapter 5

Progress regarding ISIMIP outreach

- **New repository** (data.isimip.org/): Highly convenient access to ISIMIP data
- **Interactive protocol:** combine sectors, print out pdf, save permalinks, quality check for data submission
- **ISIpedia launched:** peer-reviewed papers translated into 17 ISIpedia articles.
- **First step towards a continuous collection of impacts attribution studies**: ISIpedia article to access reference tables behind Ch16 observed impacts
- **Visualisation of ISIMIP data**: Could we use the WGI-Atlas technology to also provide access ISIMIP data? Hans-Martin Füssel (EEA) in context of the EU Climate Risk Assessment within the EU adaptation strategy? (outreach session on Wednesday afternoon)

New Sector coordinators and Sectors

Lakes: **Daniel Mercado-Betin**, Institut Català de Recerca de l'Aigua, Universidad de Antioquia, Columbia

Global Biomes: **Jinfeng Chang**, College of Environmental and Resource Sciences, Zhejiang University, China

Labour: **Shouro Dasgupta**, CMCC/Università Ca' Foscari Venezia, Italy

Energy Fluctuations and Extremes: **James Glynn**, Center on Global Energy Policy, Columbia, USA, **Michelle van Vliet**, Department of Physical Geography, Utrecht University, The Netherlands

Peat: **Sarah Chadburn**, **Angela Gallego-Sala, Noah Smith,** University of Exeter/MOTHERSHIP project, UK

The next days

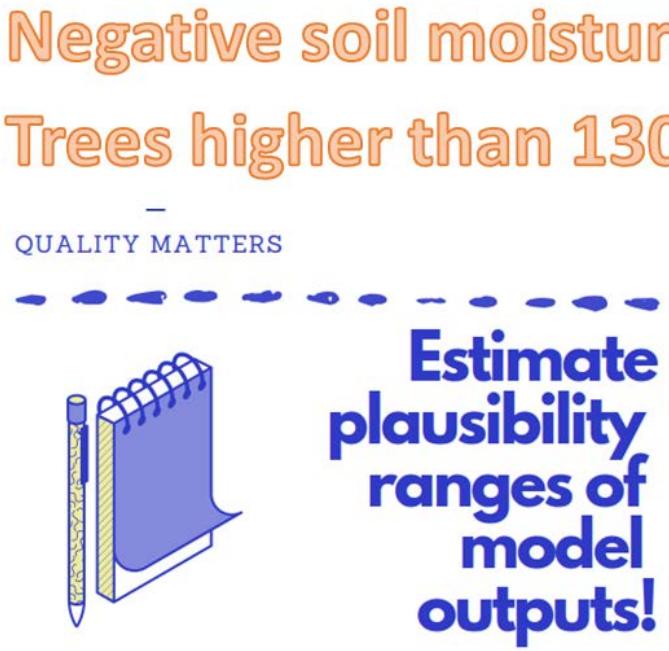
ISIMIP Sectoral session	Keynote	PROCLIAS WG1	PROCLIAS WG2	PROCLIAS WG3	PROCLIAS WG4

Time (UTC+2)	Monday 16 May	Tuesday 17 May	Wednesday 18 May	Thursday 19 May
9:00-10:30	Registration	**Plenary:** Climate Impact Attribution and Uncertainty Assessment (PROCLIAS WG 2) (9:00-10:30)	**Plenary:** Cross-sectoral climate impacts (PROCLIAS WG 3) (9:00-10:45)	Sector meeting: **Fisheries and Marine Ecosystems** (8:00-9:00)
10:30-12:30	Sector meeting: **Lakes** (10:30-12:30); Sector meeting: **Water regional (1)** (10:30-12:30)	Coffee Break (10:30-11:00); **Break-out sessions:** • Vulnerability and exposure modeling • Water Quality (TG3.9) (11:00-12:30); **Break-out session:** Open exchange on methods for climate impact attribution (11:00-12:30)	15 min Break; **Parallel Break-out sessions:** Cross-sectoral climate impacts (TG3.5, 3.7, 3.11) (11:00-12:00); **'hot model' issue in CMIP6 climate projections** (12:00-12:30); Closed session: Paper writing (11:30-13:00)	Sector meeting: **Water regional (2)** (9:30-11:30); Sector meeting: **Forest** (10:00-11:30); 15 min Break; ISIMIP Chelsa workshop (11:45-12:30)
12:30-13:30	Lunch Break			
13:30-14:30	**Opening Session** Keynote: Johan Rockström (PIK) (13:30-14:30)	**Keynotes:** Cath Senior (Met Office) Jakob Zscheischler (UFZ) (13:30-14:30)	**Plenary:** Communication and dissemination of climate impacts (PROCLIAS WG 4) (13:30-15:00)	ISIMIP Chelsa workshop (13:30-18:30)
	5 min Break	5 min Break		
14:35-15:45	**Plenary:** ISIMIP data and protocols (PROCLIAS WG 1) (14:35-15:45)	Sector meeting: **Labour** (14:35-15:35); Sector meeting **Biomes, Fire, Permafrost** (14:35-15:35)	5 min Break; **Parallel Break-out sessions:** Communication and dissemination of climate impacts (15:05-15:40)	Closed Session: ISIMIP SAB meeting (15:00-16:30)
15:45-16:10	Coffee Break and Group Photo (15:45-16:10)	Coffee Break and Poster session (15:35-16:15)	Coffee Break (15:40-16:00)	
16:10-17:40	**Parallel Break-out sessions:** ISIMIP data and protocols (TG1.1, 1.2, 1.3, 1.7) (16:10-17:40)	Parallel Sector meetings: **Water global, Health, Agriculture, Energy fluctuations and Extremes, Peat** (16:15-18:15)	**Keynotes and closing remarks:** Camille Parmesan (CNRS, UofP, UofTx) Brian O'Neill (PNNL) Closing remarks (Katja Frieler) (16:00-17:30)	
17:40-19:00	**Welcome Reception** (17:40)			
19:00		**Conference Dinner** (19:00)	**Conference Dinner** (18:30)	

Your task: Discuss and network to push the science

- Discuss results, simulations, paper plans, project proposals etc..
- Call for PROCLIAS Short Term Scientific Missions (STSM) is open
- Engage in existing Task Groups and propose new ones

PROCLIAS TG1.2: Automatic QC/QA



- You want to work with plausible model outputs and would like to detect errors in the variables as a modeller (e.g. due to errorneous data conversion)?
- The ISIMIP quality-control (QC) tool includes **a check against plausible min/max-values**.
- We need **YOUR** expertise to set those plausibility limits!
- Watch out for the posters in the venue and let‘s try to collect values for each variable. Thank you!
- Ask Hannes Müller-Schmied or Laura Dobor

Meeting etiquette and housekeeping issues

- mandatory to sign participants lists and confirm negative COVID tests every day
- get a new badge
- wear your masks
- we have physical only, hybrid and “online only” sessions ⇒behave accordingly…
- Zoom links are only available upon registration and should not be further shared
- all presenters are welcome to make their slides available on the ISIMIP and PROCLIAS website (Martin will follow-up)
- in case of any organisational questions refer to martin.park@pik-potsdam.de
- for questions regarding the PROCLIAS funding ask Antonia Mayer (antoniam@pik-potsdam.de)
- group picture

Key links

https://www.isimip.org/

https://data.isimip.org/

https://www.isipedia.org/

https://twitter.com/ISIMIPImpacts

https://proclias.eu/

https://twitter.com/climateimpacts_

ISIMIP
Inter-Sectoral Impact Model Intercomparison Project

join PROCLIAS WGs here: https://www.cost.eu/cost-action/process-based-models-for-climate-impact-attribution-across-sectors/#tabs+Name:Working%20Groups%20and%20Membership

cost
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ISIMIP Community Awards

Rec.

Awards ceremony: Sector coordination

Awards ceremony: Sector coordination

Sector coordinators having left:

- Malgorzata Golub (Lakes)
- Anne Gädeke (Permafrost)
- Kirsten Thonicke (Permafrost)
- Almut Arneth (Agriculture)
- Detlev v. Vuuren (Energy)

THANK YOU FOR SUPPORTING ISIMIP

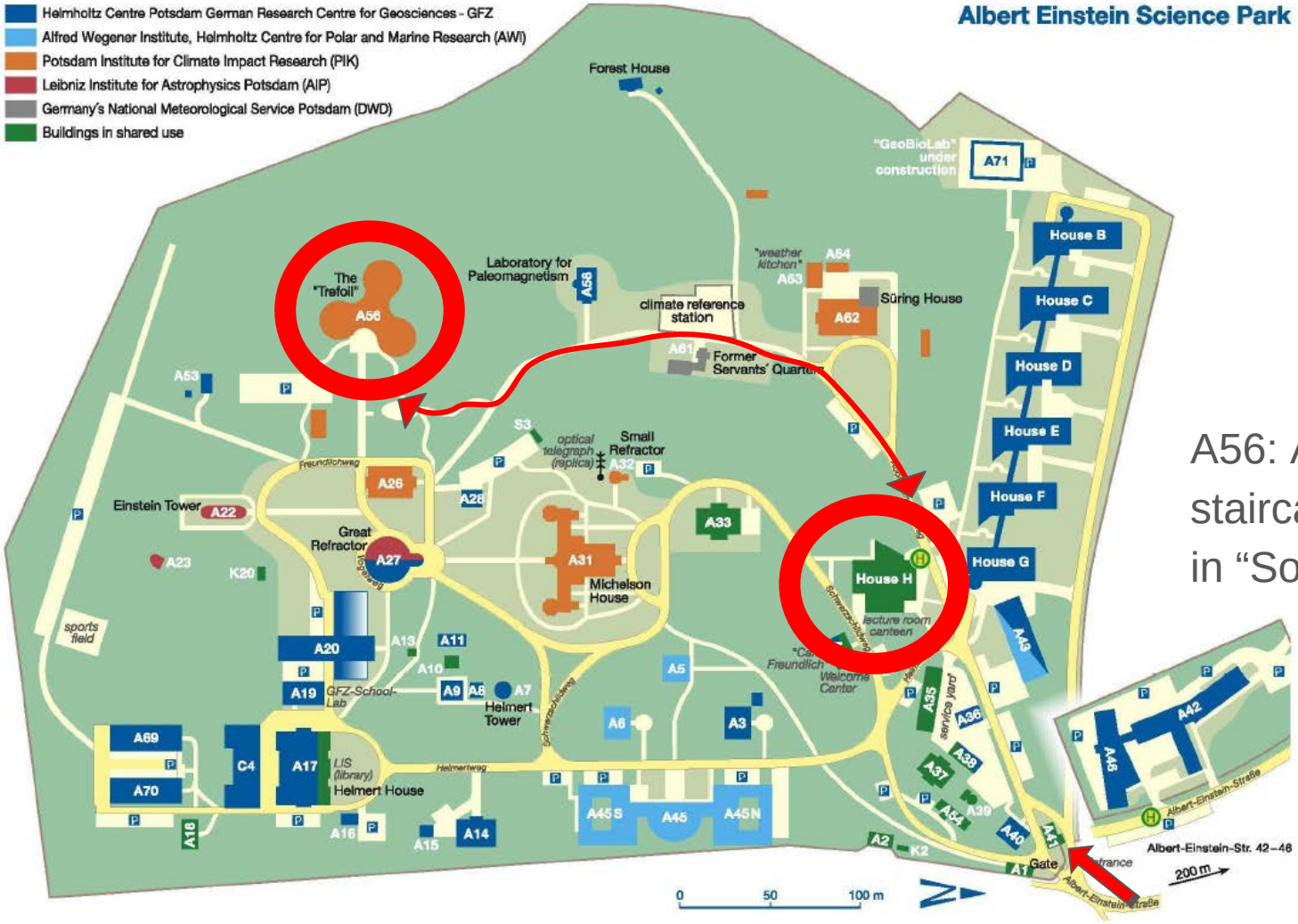
Maillot jaune - the most complete ISIMIP3 data submission:

Maillot jaune - the most complete ISIMIP3 data submission:

- Akihito Ito, National Institute for Environmental Studies (VISIT model)
- Hannes Müller-Schmied, University of Frankfurt (WaterGAP2-2e model)

The next hours… until the party…

13:30-14:30	**Opening session** A56: Conference hall	Katja Frieler, **Christopher Reyer**
	- Introductory **Keynote**: Johan Rockström, PIK	
	5 min break	
14:35-15:45	**Plenary: ISIMIP data and protocols for climate impact modeling (PROCLIAS WG 1)** A56: Conference hall	**Laura Dobor,** Wim Thiery, Stefan Lange
15:45-16:10	**Group Photo and Coffee break**	
16:10-17:40	**Break out session 1: ISIMIP Land use patterns (TG 1.1)** A56 Telepresence room (0.38)	**Miodrag Stevanovic**, Christopher Reyer
	Break out session 2: ISIMIP High resolution climate forcing data and experiments (TG 1.7) A56 Conference hall	**Dirk Karger**, Stefan Lange, Christopher Reyer
	Break out session 3: Automatic quality check / quality assessment of impact model output (TG 1.2) House H, VR1	**Hannes Müller Schmied**
	Break out session 4: New data (TG 1.3) House H, VR3	**Ann van Griensven, Alo Laas**
18:00	**Welcome Reception:** A56: Terrace in front of Conference hall	



A56: Always use staircase and elevator in “Sonne”